Hardness by EDTA Titrimetric
SM 18th /19th /20th Ed. 2340 C

Facility Name:_____VELAP ID_____

Assessor Name:_____ Analyst Name:_____ Inspection Date_____

Relevant Aspect of Standards	Method Reference	Y	N	N/A	Comments
Records Examined: SOP Number/ Revision/ Date _____ Analyst:_____ Sample ID: _____ Date of Sample Preparation:_____ Date of Analysis:_____					
If the lab prepares buffer solution (other than "odorless buffer"), is it stored in a plastic or borosilicate glass container for no longer than 1 month? Solution is discarded when 1 or 2 mL added to the sample fails to produce a pH of 10.0 ± 0.1 at the titration end point.	2340C 2.2				
If odorless buffer is used, is it prepared using 55 mL HCL, 300 mL 2-aminoethanol, and 5 g magnesium salt of EDTA diluted to 1L with deionized water?	2340C 2.a.3				
If complexing agents are needed to provide a clear, sharp change in color at the end point, are one of the following used (or a commercial preparation)? *Inhibitor 1:* adjust sample to pH 6 or higher with buffer or 0.1N NaOH, add 250 mg sodium cyanide, add buffer to adjust to pH 10 ± 0.1. *Inhibitor 2:* dissolve 5g sodium sulfide nonahydrate or 3.7g sodium sulfide pentahydrate in 100 mL water, and add 1 mL to sample during titration. *Inhibitor 3:* Dissolve 250 mg magnesium salt of 1,2 cyclohexanediamine-tetraacetic acid in 100 mL sample before adding buffer.	2340C 2.b				
Does the selected indicator give a distinct, sharp endpoint?	2340C 2.c				
Is the titrant 0.01M EDTA standardized against standard calcium solution, or is EDTA purchased? (Method does not specify required number of decimal places for standardization.)	2340C 2.d				
Are wastewater samples pretreated using nitric acid-sulfuric acid or nitric acid- perchloric acid digestion per section 3030?	2340C 3.a				
If digesting samples using nitric acid- sulfuric acid, are the following steps followed? Add 5 mL of HNO_3 to sample, boil sample, and evaporate to 15-20 mL. Add 5 mL of HNO_3 and 10 mL of H_2SO_4, and evaporate until dense white fumes just appear. Dilute to 100 mL.	3030G, 3030E				
If digesting samples using nitric acid- perchloric acid, are the following steps followed? Add 5 mL HNO_3 to sample, evaporate to 15-20 mL, add 10 mL HNO_3 and 10 mL $HClO_4$, and evaporate until dense white fumes just appear. Dilute to 100 mL.	3030H, 3030E				
Is a sample volume selected that requires less than 15 mL EDTA titrant?	2340C 3.b				

Notes/ Comments:

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Is titration completed within 5 minutes, measured from time of buffer addition?	2340C 3.b				
Is a sample aliquot of 25 mL (unless less than 5 mg/L hardness) diluted to 50 mL with distilled water, and 1 to 2 mL buffer added?	2340C 3.b				
Following the addition of buffer, are 1 to 2 drops indicator solution or an appropriate amount of dry-powder indictor formulation added?	2340C 3.b				
Following the addition of indicator, is EDTA titrant added slowly until the last reddish tinge disappears? (Solution normally turns blue.)	2340C 3.b				
For samples with hardness less than 5 mg/L, is a large aliquot of 100 to 1000 mL titrated, using proportionally larger amounts of buffer, inhibitor, and indicator?	2340C 3.c				
For samples with hardness less than 5 mg/L, is the volume of EDTA used for the blank subtracted from the volume of EDTA used for the sample?	2340C 3.c				
Is hardness calculated using the following formula? Hardness, mg/L= (A x B x 1000)/ mL sample A= mL titration for sample B= mg CaCO3 equivalent to 1.00 mL EDTA titrant	2340C 4				
Are duplicates analyzed for 10% of samples, at least one per batch?	2020				
Are matrix spike analyzed for 5% of samples, at least one per batch?	2020				

Notes/ Comments: